

WE CLAIM:

1. A marker for a magnetic anti-theft security system, said marker comprising:

an oblong alarm strip of an amorphous ferromagnetic alloy;

at least one activation strip of a semi-hard magnetic alloy, said semi-hard magnetic alloy comprising:

8 to 25 weight % Ni,

1.0 to 4.5 weight % Al,

0.5 to 3 weight % Ti, and

a remainder of iron; and

said semi-hard magnetic alloy having a coercive force H_c between 10 and 24 A/cm and a remanence B_r of at least 1.3%.

2. A marker according to claim 1, wherein the content in weight % of Ni, Al and Ti satisfies the following formula:

$$35 \leq \text{Ni}(1,75\text{Al} + \text{Ti}) \leq 110.$$

3. A marker according to claim 2, wherein the content in weight % of Ni, Al and Ti satisfies the following formula:

$$40 \leq \text{Ni}(1,75\text{Al} + \text{Ti}) \leq 90.$$

4. A marker according to claim 1, wherein the semi-hard magnetic alloy has 1.2 to 2.8 weight % Al.

5. A marker according to claim 4, wherein said semi-hard magnetic alloy further comprises at least one constituent selected from the group consisting of X and Y, wherein X is less than 5 weight % Co, and Y is less than 3 weight % of Mo or Cr.

6. A marker according to claim 5, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of Zr, Hf, Nb, Ta, Mn and Si, wherein each selected element is less than 0.5 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

7. A marker according to claim 5, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of C, N, S, P, B, H and O, wherein each selected element is less than 0.2 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

8. A marker according to claim 7, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of Zr, Hf, Nb, Ta, Mn and Si, wherein each selected element is less than 0.5 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

9. A marker according to claim 4, wherein the content in weight % of Ni, Al and Ti satisfies the following formula:

$$35 \leq \text{Ni}(1,75\text{Al} + \text{Ti}) \leq 110.$$

10. A marker according to claim 9, wherein the content in weight % of Ni, Al and Ti satisfies the following formula:

$$40 \leq \text{Ni}(1,75\text{Al} + \text{Ti}) \leq 90.$$

11. A marker according to claim 4, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of Zr, Hf, Nb, Ta, Mn and Si, wherein each selected element is less than 0.5 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

12. A marker according to claim 4, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of C, N, S, P, B, H and O, wherein each selected element is less than 0.2 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

13. A marker according to claim 1, wherein the semi-hard magnetic alloy has 1.5 to 2.8 weight % Al.

14. A marker according to claim 13, wherein the content in weight % of Ni, Al and Ti satisfies the following formula:

$$35 \leq \text{Ni}(1,75\text{Al} + \text{Ti}) \leq 110.$$

15. A marker according to claim 14, wherein the content in weight % of Ni, Al and Ti satisfies the following formula:

$$40 \leq \text{Ni}(1,75\text{Al} + \text{Ti}) \leq 90.$$

16. A marker according to claim 13, wherein said semi-hard magnetic alloy further comprises at least one constituent selected from the group consisting of X and Y, wherein X is less than 5 weight % Co and Y is less than 3 weight % Mo or Cr.

17. A marker according to claim 16, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of Zr, Hf, Nb, Ta, Mn and Si, wherein each selected element is less than 0.5 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

18. A marker according to claim 16, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of C, N, S, P, B, H and O, wherein each selected element is less than 0.2 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

19. A marker according to claim 18, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of Zr, Hf, Nb, Ta, Mn and Si, wherein each selected element is less than 0.5 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

20. A marker according to claim 13, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of Zr, Hf, Nb, Ta, Mn and Si, wherein each selected element is less than 0.5 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

21. A marker according to claim 20, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of C, N, S, P, B, H

and O, wherein each selected element is less than 0.2 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

22. A marker according to claim 13, wherein said semi-hard magnetic alloy further comprises at least one element selected from the group consisting of C, N, S, P, B, H and O, wherein each selected element is less than 0.2 weight % of the alloy and all selected elements in total are less than 1 weight % of the alloy.

23. A method for manufacturing an activation strip for a magnetic anti-theft security system, comprising the steps of:

providing an alloy having a composition of 8 to 25 weight % Ni, 1.0 to 4.5 weight % Al, 0.5 to 3 weight % Ti and a remainder of iron;

melting said alloy in an environment selected from the group consisting of a vacuum and a protective atmosphere to obtain a melted alloy, and casting said melted alloy into an ingot;

hot-working said ingot at a temperature above approximately 800°C to form a ribbon;

annealing said ribbon at a temperature above approximately 800°C;

rapidly cooling said ribbon to produce a cooled ribbon;

cold-working said ribbon to reduce the cross-section thereof by at least 90% to obtain a cold-worked ribbon;

annealing said cold-worked ribbon in a range between approximately 650°C and 700°C to obtain a cold-worked and annealed ribbon;

cold-working said cold-worked and intermediately annealed ribbon to reduce the cross-section thereof by at least 60% to obtain a twice cold-worked ribbon;

annealing said twice cold-worked ribbon at a temperature in a range between approximately 400°C and 600°C to obtain a finished ribbon; and

cutting and trimming said finished ribbon into a plurality of activation strips, said activation strips having a coercive force H_c between 10 and 24 A/cm and a remanence B_r of at least 1.3T.

24. A method according to claim 23, wherein the step of providing an alloy provides an alloy having a composition of 8 to 25 weight % Ni, 1.2 to 2.8 weight % Al, 0.5 to 3 weight % Ti and a remainder of iron.

25. A method according to claim 23, wherein the step of providing an alloy provides an alloy having a composition of 8 to 25 weight % Ni, 1.5 to 2.8 weight % Al, 0.5 to 3 weight % Ti and a remainder of iron.